

**From:** Jon Becker  
**To:** [Flooding, Yahara](#)  
**Subject:** request to YCOLTF  
**Date:** Monday, February 11, 2019 3:54:21 PM

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Hello,

Thanks for providing an online opportunity to comment or ask questions.

During YLAG2, there were calls for Lake Mendota to be lowered 6-12 inches, and then lowered another 2-3" per year, until its natural level was restored. If that had been done, Lake Mendota would have been 18-30" lower at the end of 2017. The WG should be asked: How that would have affected flooding in AUG 2018?

There's been little mention of the risk that an unnaturally high Lake Mendota poses to communities to the north of HWY 113, including the City of Madison's Cherokee Park NA, and as far north as DeForest and Morrisonville. In August 2007, after a droughty summer left ground hard-packed, a 7" (airport measurement) storm raised Lake Mendota 2", while the Yahara River north of HWY 113 (aka Cherokee Lake) soon rose 20". The Yahara River flowed north (upstream) for as time, due to the storm/wind/pressure and the lake' level.

The WG report raises concerns about the impact of lowered lake levels on habitat, and certain flora and fauna. Unnaturally high lakes have obviously impacted habitat already, drowning 2-4 square miles of wetlands/shoreline in the Lake Mendota environs alone, as well as cultural treasures (Native-American, effigy mounds, trails, etc.). The loss of that habitat has exacerbated water quality and ecological challenges. E.g., un-natural lake levels have led to the extensive deployment of shoreline rip-rap. According to a city presentation on replacement of the Starkweather Creek concrete revetment, the large boulders that will be used to replace the failing concrete wall will cost \$1000 each on average. The resulting loss of flora and fluctuating lake affects small fish populations, and thus the natural fishery (according to WDNR/Dane County research). To make no mention in the WG report of the profound losses caused by un-natural lake levels comes off as biased.

There have been some statements warning vaguely about the impact of natural lake levels on fluctuations of lake levels and on existing infrastructure.

Regarding fluctuations: The Tech WG should be asked to identify how much of any fluctation would be natural (and therefore beneficial for lake ecology, per research of Joy Zedler *et al* on native flora species competition), vs. non-natural. Perhaps for Lake Mendota this analysis should be done based one-foot increments in the lowering of the lake level, from the current Summer range, down to the natural level (3-8' lower). This analysis would also clarify some odd claims being made about Lake Mendota being used as a stormwater detention facility. Obviously, it is already being used for that purpose. So the question really is: What natural stormwater detention services were provided by the lake prior to 1849, when the first dam at Tenney Park was built? How would fluctuation vary from these natural fluctuations, given post-1849 development? given 21st century climate disruption?

As for infrastructure, during YLAG2 WDNR's Yahara watershed staffer Susan Josheff (now retired) stated in the public record that lowering Lake Mendota would have negligible impacts. Since then, some entities have invested in infrastructure that may not be compatible with natural lake levels or adaptable to climate disruption; others have wisely invested in floating piers, etc.. The WG should be asked to identify in writing: What infrastructure, public or private, would be put at risk, if Lake Mendota were to be lowered 1 foot in 2019-20? to its natural level within a longer period of time? The same questions probably should be asked regarding each of the other Yahara lakes.

The TF may want to consider the impact of unnaturally high lake levels on flooding due to storms. Non-natural lake levels cause non-natural groundflooding, reducing the perviousness of soils to some extent, that in turn increases surface runoff some. The unnaturally high lake levels also caused non-natural reversal of stream and river currents, adding to upstream surface runoff. I.e., while there is some truth to the claim that there were two flood events in August 2018, one due to the rainbomb that fell to the west and the other due to lake levels, these were not entirely separate events. To what extent did lake-levels exacerbate surface flooding?

Pumping is being considered. Is pumping downstream legal? Is this strategy usable when flooding is most problematic? Is it moral, given the additional risk it creates for communities downstream of the Yahara chain? Also: Area aquifers have been affected by high-capacity municipal wells, i.e, the "cone of depression." This has resulted in a reversal of the groundwater-to-lakewater historical flow for Lake Mendota. Could this reversal be a cause of the dramatic increase in Lake Mendota's temperature, at historically lower depths, documented this past summer? Is there a way to use excess (non-natural) water to replenish the aquifer?

Dredging is being considered, along with reduction of impediments. The WG should clarify the extent of proposed dredging. Will it be limited to non-natural sediment deposits, and kept within the natural bounds of the surface waters? Is it legal to do otherwise? With respect to impediments, will those efforts be limited to non-natural features and flora? Is removal of anything beyond those constraints legal?

Remember: The Yahara River north of Morrisonville is known locally as "The Ditch" because of how the Drainage Commission there has allowed straightening and dredging of the river's natural course.

Please consider having all WG and TF members make public any conflicts of interest. This may not be legally required of advisory groups, but is desirable as context for the public.

For instance, at the TF's FEB 4 meeting (WG member?) Dick Lathrop spoke at some length to advocate for un-natural lake levels and protection of historic infrastructure. It would be advisable for folks listening to the audiotapes or reading the minutes to know that Prof. Lathrop is associated with the UW-Madison, which just built a \$4.5 million pier structure off Memorial Union's Terrace. The pier in part serves the UW Department of Limnology, where Prof. Lathrop works; those office are located just to the north of the Union.

Thanks for your consideration of the above concerns.

Sincerely,

[Redacted signature]

Jon Becker [Redacted contact info]

**From:** Peter Cannon  
**To:** [Flooding, Yahara](#)  
**Subject:** typo or inadequate explanation  
**Date:** Monday, February 11, 2019 2:17:23 PM

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In scenario 4.1-a: “Overall minor improvements to peak levels are achieved with a drop of 2”, 2”, 2”, and 0.5” for Lakes Mendota, Monona, Waubesa, and Kegonsa, respectively.: How is this calculated? The diagram looks like Mendota peaks on August 20 at least a foot below the actual peak.

By the way, the report says that Scenario 4.1-a achieves only “minor improvements”. If you have two inches of water in your basement and the scenario reduces maximum levels by two inches, that is not a “minor improvement”!

Peter Cannon

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**From:** Peter Cannon  
**To:** [Flooding\\_Yahara](#)  
**Subject:** Scenario 4.2-a  
**Date:** Monday, February 11, 2019 2:14:50 PM

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Scenario 4.2-a: “Lower Lake Mendota one foot” ignores the other lakes. It does not surprise me that while Lake Mendota stays low, the other lakes rise. What would happen if, instead of reducing the level of Lake Mendota rapidly after August 20, it was held at its high point rather than being rapidly lowered? That level still provides a significant reserve storage in the event of another heavy rainfall, but I would guess the other lakes would drop to a much more reasonable level. We’ve always juggled all four lakes to try to keep all at a reasonable level. Why Is this scenario different?

Peter Cannon

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**From:** Peter Cannon  
**To:** [Flooding, Yahara](#)  
**Subject:** Yahara lakes dredging and pumping time line??  
**Date:** Monday, February 11, 2019 1:40:25 PM

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If we decide today to dredge the river and install diversion pipes and pumps, how long will it take to complete those tasks? What do we do about potential extreme rainfall events during the dredging and construction process?

Peter Cannon

[REDACTED]

[REDACTED]

[REDACTED]

[REDACTED]

**From:** Jan Axelson  
**To:** [Flooding, Yahara](#)  
**Subject:** Need to consider wetland losses at Cherokee Marsh  
**Date:** Sunday, February 10, 2019 6:50:23 PM

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## Need to consider wetland losses at Cherokee Marsh

Cherokee Marsh, at over 3500 acres, is Dane County's largest wetland. Located just upstream from Lake Mendota, the marsh borders the upper Yahara River. Most of the shoreline just upstream from Lake Mendota is public land, purchased with public funds in recognition of the wetlands' value.

The water level on the river at Cherokee Marsh closely follows the level of Lake Mendota. During times of high water, wave action causes chunks of shoreline wetland to break off and float downstream, eventually falling apart to be lost forever. Lowering Lake Mendota would help preserve these wetlands.

These wetland losses are a flooding concern like any other and should be factored into the decision about how to manage Lake Mendota.

Jan Axelson



**From:** Jan Axelson  
**To:** [Flooding, Yahara](#)  
**Subject:** Location of wetlands and species at risk  
**Date:** Sunday, February 10, 2019 6:49:16 PM

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Location of wetlands and species at risk

Page 21 of the report says:

Lowering Mendota 1 foot and using it as a storage reservoir produces larger water level fluctuations that could result in dislocating wetlands and impacts to state threatened species, such as Sheathed Pondweed, White Lady's Slipper, and Tufted Bulrush.

Where are these wetlands and state threatened species located and what is the source of this information?

Jan Axelson  


**From:** Jan Axelson  
**To:** [Flooding, Yahara](#)  
**Subject:** Question about the scenario using Mendota for flood storage  
**Date:** Sunday, February 10, 2019 6:49:00 PM

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## Question about the scenario using Mendota for flood storage

In the scenario to lower Lake Mendota 1 foot while managing the lake for flood storage, the graph (page 22) shows Lake Mendota continuing to be lowered in spring even after the lower lakes have risen above their summer maximums.

If using Mendota for flood storage, why doesn't the scenario let Mendota rise at this point? Will the technical committee provide an edited version of this scenario that attempts to keep the lower lakes below their maximums in spring?

Jan Axelson





**From:** Jan Axelson  
**To:** [Flooding, Yahara](#)  
**Subject:** Need for scenarios for other rainfall patterns  
**Date:** Sunday, February 10, 2019 6:48:25 PM

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## Need for scenarios for other rainfall patterns

The adaptation scenarios in the Technical Work Group's report show only the scenarios' responses for 2018. The INFOs model is a powerful tool that can guide decision making but only if fully used to evaluate a range of options under varying rainfall patterns.

To make an informed decision on lake-level management, it would be helpful to see and review lake levels under different seasonal rainfall patterns, such as a variety of examples from the past 20 years.

Will the technical committee provide these scenarios?

Jan Axelson



**From:** Jan Axelson  
**To:** [Flooding, Yahara](#)  
**Subject:** Need for scenarios when operating at the summer minimums  
**Date:** Sunday, February 10, 2019 6:47:22 PM

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## Need for scenarios when operating at the summer minimums

The County Board has directed staff to operate the lakes at their summer minimum levels until after the task force has made its recommendations. The Dane County Natural Hazard Mitigation Plan also states as a mitigation objective to maintain the levels of the Yahara lakes at the lower limit of the DNR's set operating range.

To make an informed decision about whether to continue to operate Lake Mendota or all of the lakes at their summer minimums, it would be helpful to review scenarios that show the effects of doing so.

Will the technical committee provide these scenarios?

Jan Axelson



**From:** Brian Standing  
**To:** [Flooding, Yahara](#)  
**Subject:** Re: Yahara flooding taskforce report  
**Date:** Friday, February 08, 2019 4:36:00 PM

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[REDACTED]

[REDACTED]

On 2/8/19 4:34 PM, Brian Standing wrote:

Hello,

Thanks for the opportunity to provide input. Based on what I've read so far, I have several questions I would like to discuss.

1. Do we know what the downstream impacts (on Janesville, for example) might be of sending more water downstream faster?
2. When we harvest "weeds," do we make any distinction between invasive species, like Eurasian Millfoil, and beneficial, native riverine and lacustrine plants? Do we have any idea what the impacts of increased harvesting might be on fish and aquatic wildlife habitat?
3. Do we have a good model of how the Yahara functioned prior to human intervention? What, if anything, can we do to mimic those conditions given the current built environment?
4. Do we know how much "buffer room" we would need to keep the Yahara dams from overtopping, if we experienced another 15" rain event that fell squarely in the Yahara watershed? (Last summer's event fell partly in the Yahara and partly in the Lower Wisconsin).

Feel free to contact me if I can elaborate. Thanks again.

Brian Standing, [REDACTED]

[REDACTED]

**From:** Stephen Burgess  
**To:** [Flooding, Yahara](#)  
**Subject:** RE: 2018 Yahara Chain of Lakes Flooding Technical Work Group Report  
**Date:** Thursday, February 07, 2019 10:20:51 PM  
**Attachments:** [Yahara](#) [REDACTED]

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Here's my submission of feedback on this document. In short, I suggest that the city follows the FEMA National Flood Insurance Program floodplains management procedures and that any dredging is approved by the Ho Chunk tribe as it will affect the historical site of a fishing weir. Following the NFIP guidelines for a floodplains would mean restricting development which would increase runoff in this flood zone. I've attached the document version of my note as well as including the text in the body of this email. You may respond to this email ([REDACTED]) if you would find value in continuing a conversation. Thank you.

Stephen Burgess

To the Yahara Lakes Flooding Technical Work Group:

I crossed the Yahara at Williamson twice a day during the flooding. I watched the level of the river rise, stay very high, and then finally fall again, against the ruler of the foundation of the bridge north of Willy. I saw businesses shut down right after this event. I saw my neighbors put many hours into stacking sand bags. Those uncounted costs of flooding should be front and center in our discussions of this issue. The flooding cost real money to real people of all economic stripes. Many of those people were not compensated, and could not even have been compensated.

The 2018 flooding has established the fact that the Yahara is a known flood-risk zone. That should qualify the zone to enter into floodplains management procedures as described by FEMA's National Flood Insurance Program. The program may be entered into, but the guidelines should be followed regardless of whether the area is entered into the NFIP or not. Some of these guidelines are as follows:

- Regulations to prohibit development in high-hazard areas.
- Building codes requiring flood-resistant construction for new buildings
- Acquiring land in a floodplain in order to preserve open space and permanently relocate buildings
- Modifying or retrofitting existing buildings
- Preparing people and property for flooding through forecasting, warning systems and emergency plans
- Providing self-help advice to property owners.
- Using zoning codes to steer development away from hazardous areas or

natural areas deserving preservation

- Rigorously following building, health and sanitary codes\*
- Restoring and preserving the natural resources and functions of flood-plains
- Controlling runoff from areas under development outside the floodplain.
- Restoration of floodplains and wetlands and preservation of natural functions and habitats.

Development on and near this area has increased stormwater runoff. Now, this area is a known flood area and should follow the guidelines to be eligible for the National Flood Insurance program. Following these guidelines and being in the program will make residents eligible for national flood insurance. Here are some quotes from the NFIP guidelines:

- Basic rule #3: Development must not increase the flood hazard on other properties
- Communities must regulate development in these floodways to ensure that there are no increases in upstream flood elevations.
- All new construction and substantial improvements of residential structures must be elevated so that the lowest floor (including the basement) is elevated to or above the (Base Flood Elevation) BFE.
- Floodway requirements in particular are defensible because they prevent the actions of one property owner from increasing flood damage to his or her neighbors

## **Dredging**

Dredging the Yahara River would impact historical artifacts such as the Native American Fish Weir.

The Ho Chunk and neighborhood associations should be involved in any conversation that may impact or destroy historical artifacts such as fishing weirs. The plan for dredging would also require “the acquisition of land,” which I interpret as eminent domain. Unlike the suggestion of the NFIP to seize land “in order to preserve open space,” this report proposes to seize land in order to dredge the Yahara. It is not that we haven’t been dredging the Yahara that caused the floods. It’s that we’ve allowed development to increase storm water runoff when we should not have. That should stop.

**From:** Jean Whitcomb  
**To:** [Flooding, Yahara](#)  
**Subject:** Re: questions/comments for the Task Force  
**Date:** Thursday, February 07, 2019 10:09:31 PM

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[REDACTED]

[REDACTED]

[REDACTED]

Hello all,

I am an Isthmus resident living on Lake Monona. At the Task Force meeting on 2/4/19, the public was encouraged to submit questions and comments via email. Here is my list.

- I like the idea of using INFOS, but, if 2018 is not representative of future years, then doesn't that raise questions about the INFOS results using only 2018 data? How will this model be evaluated/maintained to maximize model performance over time? Will resources be committed to maintaining the model and reviewing/updating policies/plans in a timely manner?
- Only a few strategies were analyzed. Seems like these strategies are those suggested by public (except pumping). Are there other promising strategies that technical experts might recommend?
- How long will it take to implement effective strategies? We need short term solutions for this spring/summer and beyond until effective long term strategies can be implemented. I think someone said that most if not all of the Yahara lakes are already near the summer maximum. Yikes!
- Why wasn't the dam at Stoughton fully open during the August/Sept flooding? I know from observation that at least one of the 3 gates at that dam was blocking water flow during this time. Confusing that this dam at Stoughton wasn't fully open all summer like Babcock and LaFollette since it would have been a relatively inexpensive way to increase water flow.
- Is there a plan to revisit recommendations of Stormwater TAC? Seems like more effort needs to be made to prevent water from getting to lakes in the first place.

I was sitting in the back and may have misheard some of the conversation. Sound did not carry well to the back of the room.

Despite these questions/concerns, I came away encouraged and impressed by the work that has been done so far and the sense of urgency to address the issues.

Thank you!

Jean Whitcomb

[REDACTED]

**From:** Connie Hagen  
**To:** [Flooding, Yahara](#)  
**Subject:** Questions on the 2018 Yahara Chain of Lakes Flooding Technical Work Group Report  
**Date:** Thursday, February 07, 2019 7:41:52 PM

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The Technical Work Group Report was very interesting and well thought out. Thank you to those who worked on this report and turned it around in such a short amount of time.

I have a number of questions for the task force/committee:

#### 1. Question on Scenario Selection

It would be helpful to understand exactly how the 7 scenarios were decided (and by whom).

- John Reimer suggested that the task force chose some of the scenarios as a result of the YLAG1 and YLAG2 recommendations and public comment. I reviewed those reports and do not see a number of the scenarios mentioned and certainly not the specific scenarios presented in the report.
- During the 2/4/19 meeting, John Reimer and Laura Hinklin of LWRD both indicated that it was highly unlikely that additional scenarios would be run through the modeling system during this process.
- Based on the scenario limitation, it seems that the committee is being asked to decide policy based on only the 7 scenarios in the report.
- As presented in Summary Table 5, it appears that the “best” scenario has already been determined by the task force.

I understand the specific scenarios will be detailed in the next two meetings but it would be better if we knew up front why these were selected.

#### 2. Aquatic Plant Management

Section 4.1 discusses aquatic plant management and provides the two extreme scenarios but aggressive aquatic plant harvesting in the Yahara River to maximize flow is not included in the Table 5 summary (page 44) for recommendations. Wouldn't it be beneficial to recommend working with the DNR to provide regular plant harvesting below the LaFollette dam rather than having to seek emergency orders? The flow through the Stoughton dam was increased over 2 fold.

#### 3. Mitigation not considered in the 7 scenarios

Mitigation that wasn't considered or modeled in the scenarios but was included under 'Continuing efforts' in the report:

- Wetland expansion/restoration (most of the public comments were centered on this aspect),
- Run-off reduction (urban run-off discussed as part of the Stormwater Technical Advisory Committee presentation)

Was it taken for granted that mitigation practices in these two areas would be performed or will they be considered separately by the committee? They are important aspects of getting the flood risk under control and the committee has been tasked with identifying both short and long-term approaches to improve resiliency.

#### 4. Scenario “Remove all dams from the Yahara Lakes”

Using the 2018 data, the title of this scenario may be misleading as it was mentioned a number of times that Babcock and LaFollette dams have been open for two years so they have effectively already been “removed”. Stoughton dam is below the entire chain of lakes and was operated essentially full open for most of 2018. The flow difference at Stoughton dam was mainly due to cutting aquatic plants and dredging at the railroad bridge. Is this scenario really modeling if Tenney dam was removed in 2018?

Does this show that lake level management through Tenney dam was not effective in 2018? Only 1-3”?

#### 5. Scenario “Lower Lake Mendota one foot”

The results of lowering Lake Mendota one foot to use as storage for extreme rain events is evaluated as “minor improvements” to peak water levels. Could the level be lowered earlier than March (i.e. during the spring thaw) to increase capacity for early rains? I’m sure the DNR has extensive data on levels needed for spawning. How would the evaluation of lowering Mendota for storage capacity change if the dredging, pumping, plant cutting, etc. had improved the flow through the Yahara? It seems that if the water was flowing through the chain that this storage capacity would then be highly effective as an answer to reducing flood risk. Shouldn’t this then also be considered as part of the “combined” solution.

Thank you,

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**Connie Hagen**





**From:** Don Last  
**To:** [Flooding, Yahara](#)  
**Subject:** Relevant Mendota High Water Images-2008  
**Date:** Thursday, February 07, 2019 3:30:55 PM  
**Attachments:** [LakeMendota-41\(2008\).mov](#) Click on link for youtube video

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Lake Level Task Force Members:

In 2008, Lake Mendota was so high it was nearly climbing over strip of land along Sherman Avenue and near the locks. My concern then (and now) was whether the 200 yard long low earthen berm connected was tall enough to survive more rain and higher waves generated by a strong NW wind.

This berm integrity issue is illustrated by five photos and one video (attached) that I took June 15, 2008.

Note in the video that high lake waves are battering the shoreline with the spray spilling into the parking lot at Tenney. The earthen berm rests below the gravel footpath. In one of my photos, the surface of Sherman Avenue is not even visible because that day the unseen pavement likely was below the surface of Lake Mendota. Scary, right? Same high water situation scared me again in 2018.

I ask your group to help with my peace of mind and that whatever options you recommend for implementation, you will be able to assure me that Lake Mendota will never get high enough to spill over the earthen berm at Tenney Park ala the tragedy at Lake Delton.

Donald Last  


Images from Don Last







**From:** Dave Marshall  
**To:** [Flooding, Yahara](#)  
**Subject:** RE: Technical Report comments  
**Date:** Thursday, February 07, 2019 12:42:31 PM  
**Attachments:** [Comments on Technical Work Group Report.docx](#)

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Sorry, I now included contact information on comment document.

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**From:** Dave Marshall [REDACTED]  
**Sent:** Thursday, February 07, 2019 10:17 AM  
**To:** 'yaharaflooding@countyofdane.com' <yaharaflooding@countyofdane.com>  
**Subject:** Technical Report comments

I was asked by a neighborhood group to review and comment on the Technical Report. Please accept my attached comments. Thank you,

Dave Marshall, Aquatic Ecologist – P.H.  
Underwater Habitat Investigations LLC

[REDACTED]  
[REDACTED]  
[REDACTED]

Comments on 2018 Yahara Chain of Lakes Flooding Technical Work Group Report

February 7, 2019

Prepared by

David W. Marshall, Aquatic Ecologist [REDACTED]

(retired WDNR Water Resources Management and Fisheries Habitat Protection 1976-2006. Southern District Madison biologist assigned to Madison Lakes 1979-1991, member of cooperative UW Madison Limnology – WDNR Integrated Management of Macrophytes and Fisheries Research Project that focused on Lake Mendota and Fish Lake 1990-1995. Currently Aquatic Ecologist-P.H. Underwater Habitat Investigations LLC established 2006.)

The technical report provides a sobering analysis of the impacts of Global Warming (Climate Change) on Yahara Chain of Lakes flooding and the challenges that lie ahead. The report provides a preliminary analysis of adaptive management and mitigation strategies designed to reduce future flooding impacts but much more work is clearly needed.

#### Lake Mendota Water Level Issues

Model output reveals a number of options with dredging and pumping as a significant part of an integrated flood control management effort. However effective recommendations will ultimately require a much larger lens, encompassing issues beyond flooding impacts alone. We've heard comments that Lake Mendota should not be used as reservoir. Lake management strategies should transcend water level management alone and consider lakes as living ecosystems. In 2.1, the report refers to the established water level orders that *"seek to balance competing interests, such as navigation, flood control, fisheries, and recreation."* A strong argument can be made that the orders established in 1979 disproportionately supported navigation and recreation as vested interests that wanted higher water levels to accommodate larger power boats and shorter piers. The "fisheries" interest primarily represented the desire to improve northern pike spawning habitats. But other aspects of lake habitat were largely ignored.

Today, most of the lake shorelines are completely armored as riparian property owners responded to shoreline erosion by paying for either riprap or seawall construction. As a result, artificially high water levels and armored shorelines have taken a significant toll on nearshore habitat. Sustained high water moves almost vertically along armored shorelines while shallow shoals required by many nongame fish species disappeared. Wisconsin DNR notes that roughly 90% of aquatic life in lake ecosystems live in nearshore areas (<https://dnr.wi.gov/lakes/criticalhabitat/>) that are vital for lake ecosystem functions and biodiversity. Nongame fish populations are particularly vulnerable to changes in this habitat. Lyons (1989) documented significant losses of nongame fish species in Lake Mendota. These losses also occurred in numerous other southern Wisconsin glacial lakes due to habitat degradation from shoreline development (Marshall and Lyons 2008). More recently the dearth of nearshore shallow shoal habitats in Lake Mendota and Lake Monona was documented in 2017 (Marshall et al. 2018). Based on this study, greater nongame species richness occurred where shallow shoals persisted, but these habitats were very scarce.

The model used in the Technical Report results suggested that lowering the water level of Lake Mendota one foot would provide little benefit since storage capacity would be lost after reaching the 100-year level. Lowering Lake Mendota two feet was not assessed in the report but may allow temporary storage before reaching the 100-year level. Shallow shoal habitats could redevelop under a two feet lower water level regime.

The Technical Report mentions the threat of lower lake levels on fish spawning. While the report doesn't mention the species, the target species is usually northern pike. Northern pike is one species in a complex ecosystem that is managed both by harvest regulations and stocking that is required to sustain the population due to harvesting. Higher water levels alone will not sustain the population nor eliminate the need for stocking. From 2000 through 2016, 1,443,536 northern pike were stocked in Lake Mendota.

With the exception of infrequent sampling, nongame game species in the Madison lakes have been ignored; without any form of management or protection. The loss of habitat due to high water has been more significant than the limited benefits high water may provide a few targeted species. If stated goals are to manage Lake Mendota as a natural lake ecosystem instead of a reservoir then serious consideration must be given to lower lake levels. A two-foot decrease in Lake Mendota water levels could significantly improve habitat for many fish species and should be considered in concert with a number of other options mentioned in the report.

#### Pumping Scenarios

With regards to the pumping scenarios, Badfish Creek is not a good option. Flooding along Badfish Creek has occurred for decades. Affected property owners had been compensated for flood damage since the late 1970s. During the early 1980's, efforts to reduce flooding focused on reducing macrophyte growths (Sago pondweed – *P. pectinatus*) in the ditch and creek. Aquatic plant control efforts included both experimental Endothall titration applications and mechanical harvesting. Concern over the persistent flooding, limited channel flow capacity and projected future increases of treated wastewater discharges to the creek formed the genesis for the proposed 2.5 mgd wastewater diversion to Badger Mill Creek. The decision was ultimately approved after issues surrounding the groundwater cone of depression (Bradbury 1999) and interbasin transfer contributed to the problem.

#### Continuing Efforts Stormwater Runoff Control

The Technical Report mentions continued ongoing efforts to reduce stormwater runoff from urban areas and new developments, along with recommended new initiatives. One recommendation is to restore wetlands along Door Creek. This discussion needs to include the upper Yahara River watershed that drains into Lake Mendota. Industrial scale agriculture dominates both the Door Creek watershed and upper Yahara River. Excessive nutrient inputs into the upper Yahara River continues to plague Lake Mendota that in turn affects the lower lakes (Lathrop 2007). Reducing Madison lakes eutrophication will likely require a change or reduction in the number of industrial scale farms.

Providing incentives to change agriculture is not new. Beginning with the 1985 Farm Bill, producer incentives that removed row crop production on highly erodible lands across the Southwest Grassland and Stream Conservation Area provided significant wildlife and environmental benefits (<https://dnr.wi.gov/topic/Lands/Grasslands/documents/SWGFfeasStudy.pdf>). The combination of

reduced polluted runoff and aquifer recharge associated with the Conservation Resource Program greatly improved trout habitat across this region (Marshall et al. 2008). A similar approach could be applied to the upper Yahara River and Door Creek watersheds designed to restore wetlands, reduce stormwater runoff and pollution that plagues the Madison lakes. Models have demonstrated that largescale agriculture in the upper Yahara River contribute large phosphorus loads to Lake Mendota and Climate Change exacerbates the problem (Carpenter et al. 2015). Standard NRCS 590 nutrient management practices that guide industrial agriculture are agronomic and will not protect water quality. The pollution includes not only phosphorus but also nitrogen. Nitrate pollution is widespread in both watersheds contaminating drinking water supplies and contributing to eutrophication. Frederick Springs along Pheasant Branch Creek is highly prized as a unique natural feature that flows into Lake Mendota. The spring is now highly contaminated with NO<sub>3</sub>-N+NO<sub>2</sub>-N around 14 mg/l that is linked to industrial scale agricultural pollution (McDonald et al. 2014). The nitrate levels consistently found in the spring exceed chronic toxicity criteria of 2.5 mg/l for fish and aquatic life (Camargo and Alonso 2005). Concerns for pollution should be considered alongside with flooding issues to effectively manage the lakes as ecosystems and not recreational reservoirs.

#### References

- Bradbury, K., et al. 1999. *Hydrogeology of Dane County, Wisconsin*. Open File Report 1999-2004, Wisconsin Geological and Natural History Survey, University of Wisconsin-Extension. Prepared in cooperation with the U.S. Geological Survey and the Dane County Regional Planning Commission. Madison, WI.
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